

CLAIMS:

1. A phase-change cooling system for a vehicle comprising:

an electronic control device for receiving power from a power source and having a first temperature; and

a condenser of an air conditioning system of the vehicle thermally communicating with said electronic control device and having a second temperature less than the first temperature to remove heat from said electronic control device due to a phase-change of coolant in said condenser.

2. A phase-change cooling system as set forth in claim 1 wherein said electronic control device comprises a housing and at least one electronic switch disposed within said housing.

3. A phase-change cooling system as set forth in claim 2 wherein said housing is made of a conductive metal material.

4. A phase-change cooling system as set forth in claim 2 wherein said at least one electronic switch is of a semiconductor type.

5. A phase-change cooling system as set forth in claim 2 wherein said condenser includes a thermal interface between said housing and the coolant.

6. A phase-change cooling system as set forth in claim 5 wherein said thermal interface is made of a conductive metal material.

7. A phase-change cooling system as set forth in claim 1 wherein said condenser has a coolant disposed therein.

8. A phase-change cooling system as set forth in claim 7 wherein said coolant has a liquid phase and a vapor phase.

9. A phase-change cooling system as set forth in claim 8 wherein said condenser has a lower portion and an upper portion.

10. A phase-change cooling system as set forth in claim 9 wherein said lower portion has a liquid coolant disposed therein.

11. A phase-change cooling system as set forth in claim 9 wherein said upper portion has a vapor coolant disposed therein.

12. A phase-change cooling system for a vehicle comprising:

a power source;

an electronic control device for receiving power from said power source and having a first temperature; and

a condenser of an air conditioning system of the vehicle thermally communicating with said electronic control device and having a second temperature less than the first temperature to remove heat from said electronic control device due to a phase-change of coolant in said condenser.

13. A phase-change cooling system as set forth in claim 12 wherein said electronic control device comprises a housing and at least one electronic switch disposed within said housing.

14. A phase-change cooling system as set forth in claim 13 wherein said housing is made of a conductive metal material.

15. A phase-change cooling system as set forth in claim 13 wherein said at least one electronic switch is of a semiconductor type.

16. A phase-change cooling system as set forth in claim 13 wherein said condenser includes a thermal interface between said housing and the coolant.

17. A phase-change cooling system as set forth in claim 16 wherein said thermal interface is made of a conductive metal material.

18. A phase-change cooling system as set forth in claim 16 wherein said thermal interface is located on a lower portion of said condenser.

19. A phase-change cooling system as set forth in claim 12 including a coolant disposed in said condenser having a liquid phase and a vapor phase.

20. A vehicle comprising:
a power source;

at least one electric power cable having one end connected to said power source;

an electronic control device connected to another end of said at least one electric power cable for receiving power from said power source and having a first temperature, said electronic control device comprising a housing and at least one electronic switch disposed within said housing; and

a condenser of an air conditioning system of said vehicle having a coolant disposed therein and a thermal interface between said housing and said coolant to thermally communicate with said electronic control device, said condenser having a second temperature less than the first temperature to remove heat from said electronic control device due to a phase-change of said coolant in said condenser.